Fig.1

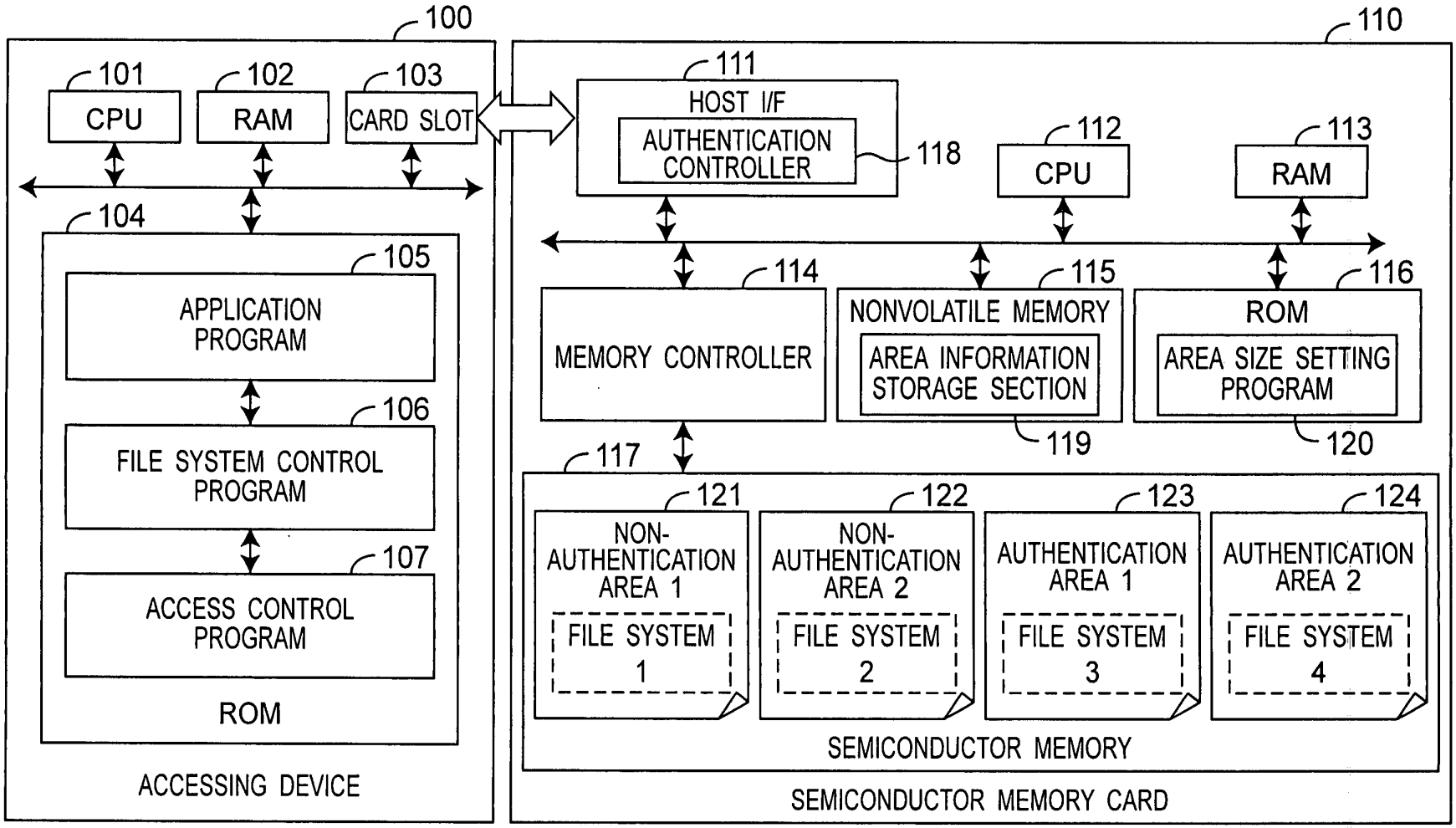

100
101
CPU
102
RAM
103
CARD SLOT
104
105
APPLICATION PROGRAM
106
FILE SYSTEM CONTROL PROGRAM
107
ACCESS CONTROL PROGRAM
ROM
ACCESSING DEVICE
110
111
HOST I/F
AUTHENTICATION CONTROLLER
118
112
CPU
113
RAM
114
MEMORY CONTROLLER
115
NONVOLATILE MEMORY
AREA INFORMATION STORAGE SECTION
119
116
ROM
AREA SIZE SETTING PROGRAM
120
117
121
NON-AUTHENTICATION AREA 1
FILE SYSTEM 1
122
NON-AUTHENTICATION AREA 2
FILE SYSTEM 2
123
AUTHENTICATION AREA 1
FILE SYSTEM 3
124
AUTHENTICATION AREA 2
FILE SYSTEM 4
SEMICONDUCTOR MEMORY
SEMICONDUCTOR MEMORY CARD

Fig.2

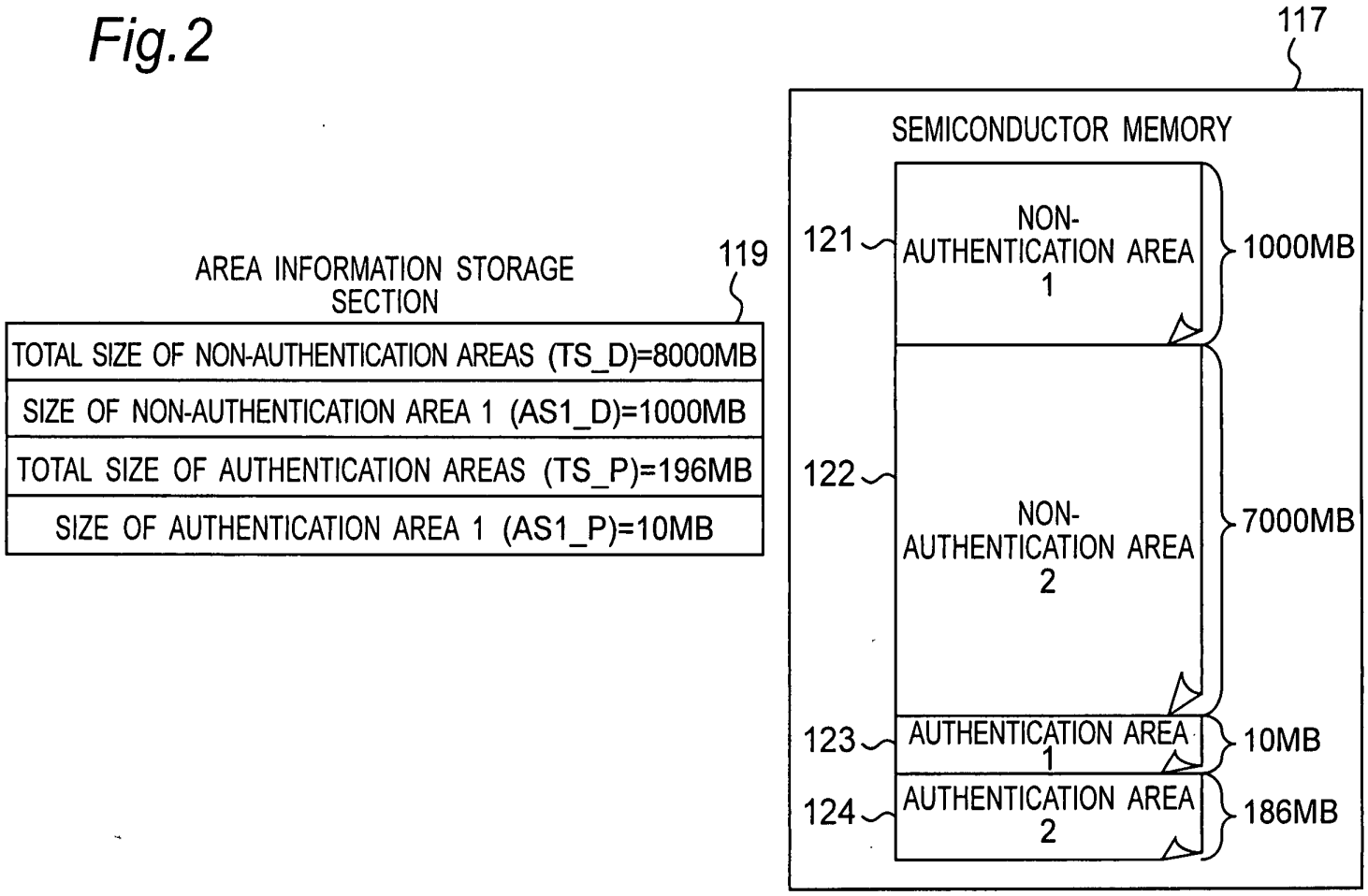

AREA INFORMATION STORAGE SECTION
119
TOTAL SIZE OF NON-AUTHENTICATION AREAS (TS_D)=8000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=1000MB
TOTAL SIZE OF AUTHENTICATION AREAS (TS_P)=196MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=10MB
117
SEMICONDUCTOR MEMORY
121
NON-AUTHENTICATION AREA 1
1000MB
122
NON-AUTHENTICATION AREA 2
7000MB
123
AUTHENTICATION AREA 1
10MB
124
AUTHENTICATION AREA 2
186MB

Fig.3

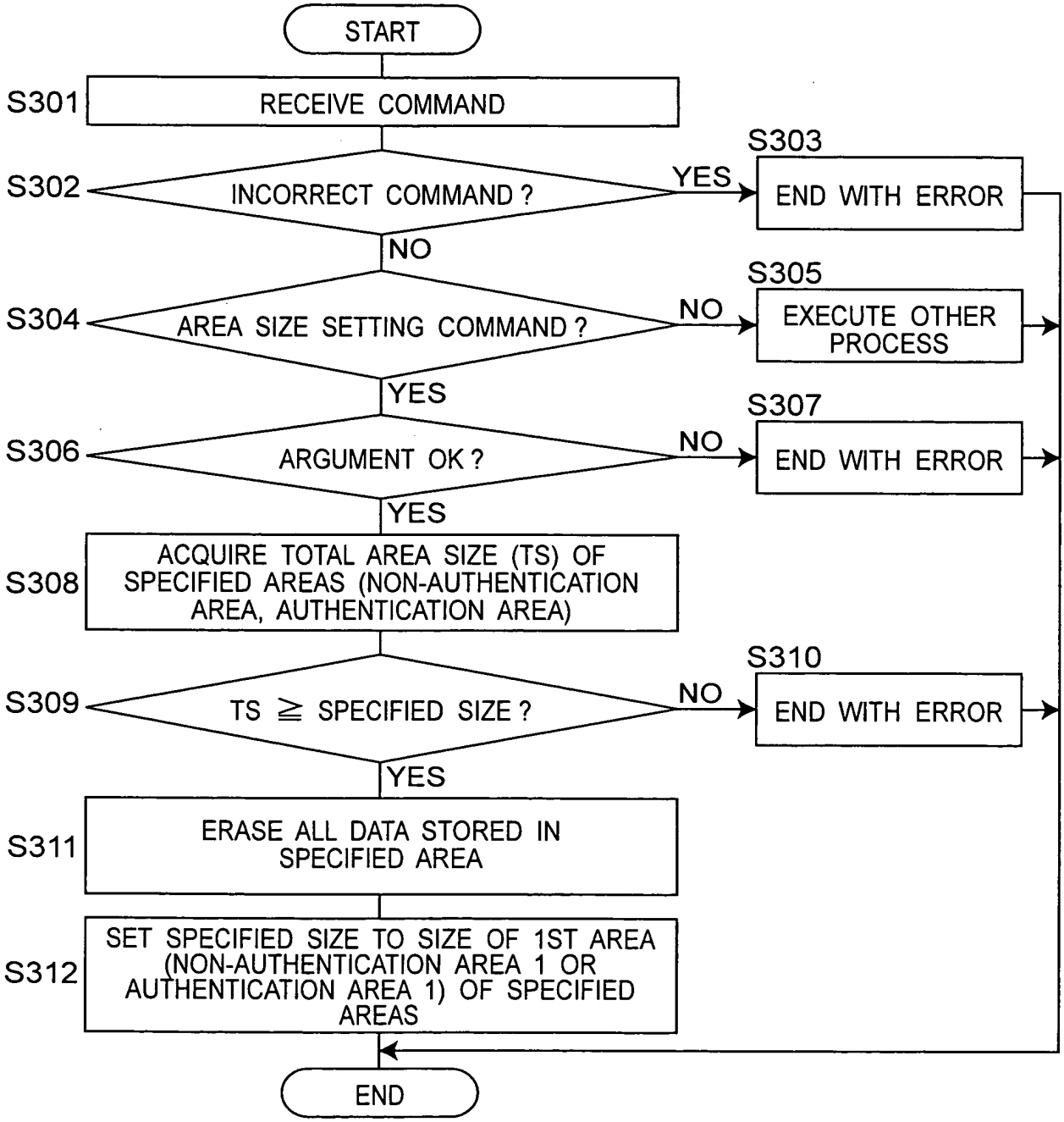

START
S301
RECEIVE COMMAND
S302
INCORRECT COMMAND ?
YES
S303
END WITH ERROR
NO
S304
AREA SIZE SETTING COMMAND ?
NO
S305
EXECUTE OTHER PROCESS
YES
S306
ARGUMENT OK ?
NO
S307
END WITH ERROR
YES
S308
ACQUIRE TOTAL AREA SIZE (TS) OF SPECIFIED AREAS (NON-AUTHENTICATION AREA, AUTHENTICATION AREA)
S309
TS ≧ SPECIFIED SIZE ?
NO
S310
END WITH ERROR
YES
S311
ERASE ALL DATA STORED IN SPECIFIED AREA
S312
SET SPECIFIED SIZE TO SIZE OF 1ST AREA (NON-AUTHENTICATION AREA 1 OR AUTHENTICATION AREA 1) OF SPECIFIED AREAS
END

Fig.4

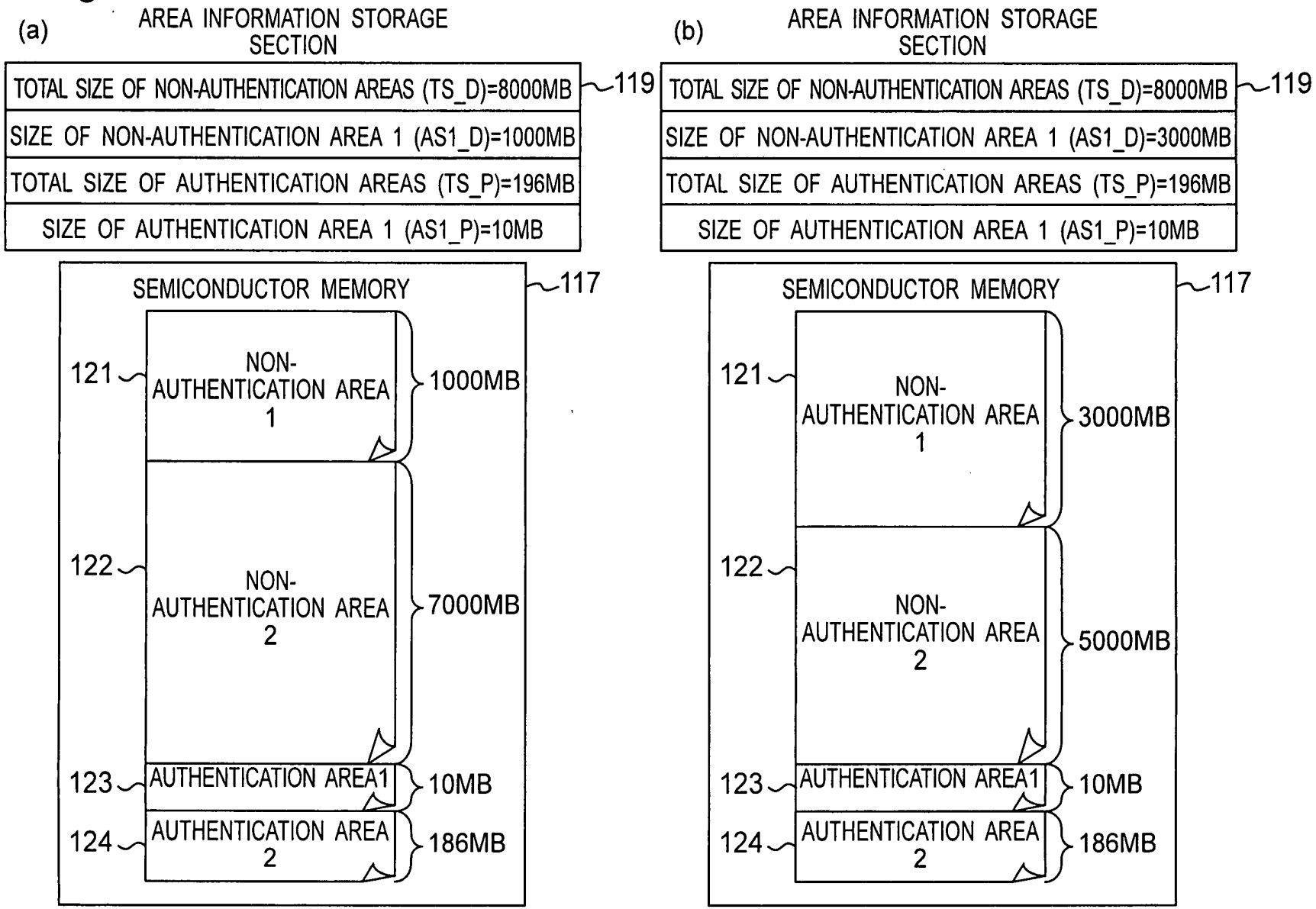

(a)
AREA INFORMATION STORAGE SECTION
TOTAL SIZE OF NON-AUTHENTICATION AREAS (TS_D)=8000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=1000MB
TOTAL SIZE OF AUTHENTICATION AREAS (TS_P)=196MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=10MB
119
SEMICONDUCTOR MEMORY
117
121
NON-AUTHENTICATION AREA 1
1000MB
122
NON-AUTHENTICATION AREA 2
7000MB
123
AUTHENTICATION AREA1
10MB
124
AUTHENTICATION AREA 2
186MB
(b)
AREA INFORMATION STORAGE SECTION
TOTAL SIZE OF NON-AUTHENTICATION AREAS (TS_D)=8000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=3000MB
TOTAL SIZE OF AUTHENTICATION AREAS (TS_P)=196MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=10MB
119
SEMICONDUCTOR MEMORY
117
121
NON-AUTHENTICATION AREA 1
3000MB
122
NON-AUTHENTICATION AREA 2
5000MB
123
AUTHENTICATION AREA1
10MB
124
AUTHENTICATION AREA 2
186MB

Fig.5

AREA INFORMATION STORAGE SECTION 119

TOTAL SIZE OF FIRST AREA (TS_1)=3000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=100MB
TOTAL SIZE OF SECOND AREA (TS_2)=7000MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=200MB

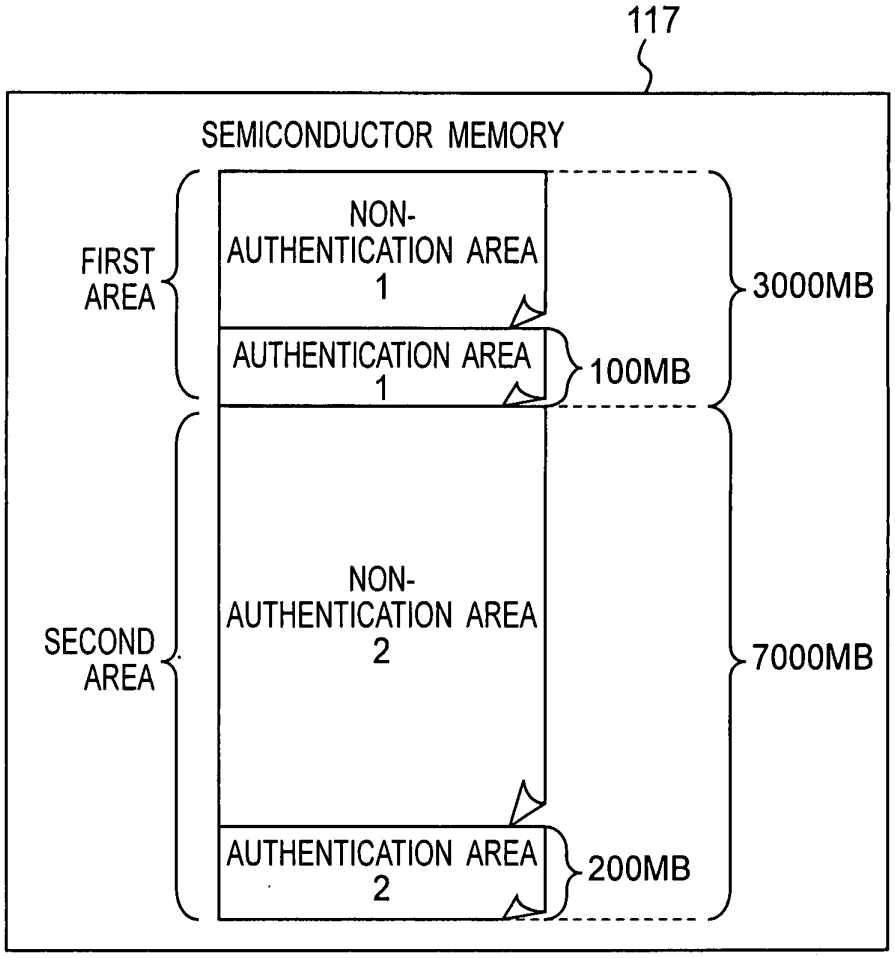


Fig.6

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=7600MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=20MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=380MB
RATE OF AUTHENTICATION AREA 1 (RT1)=1%
RATE OF AUTHENTICATION AREA 2 (RT2)=5%

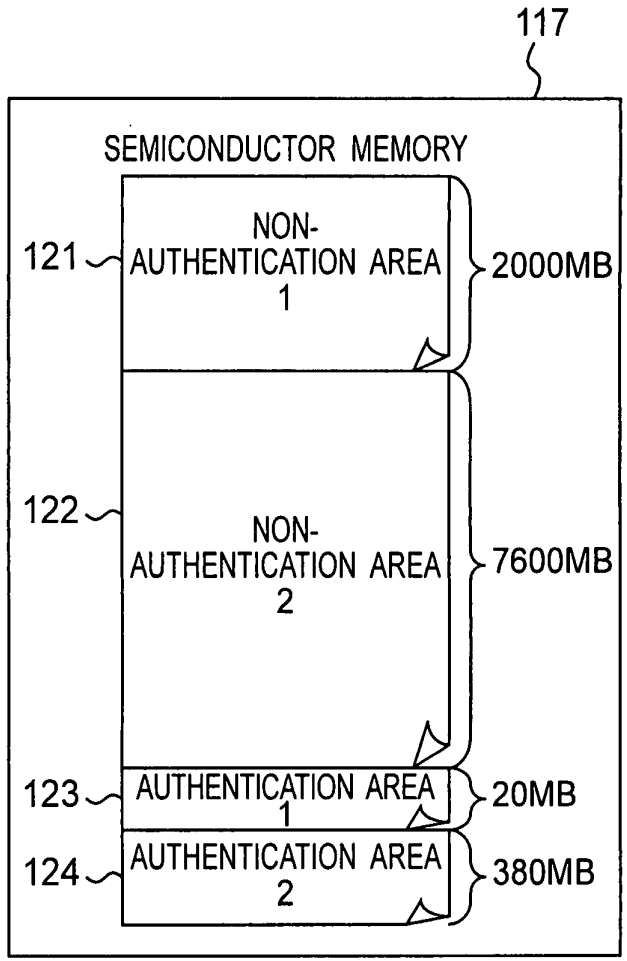


Fig.7

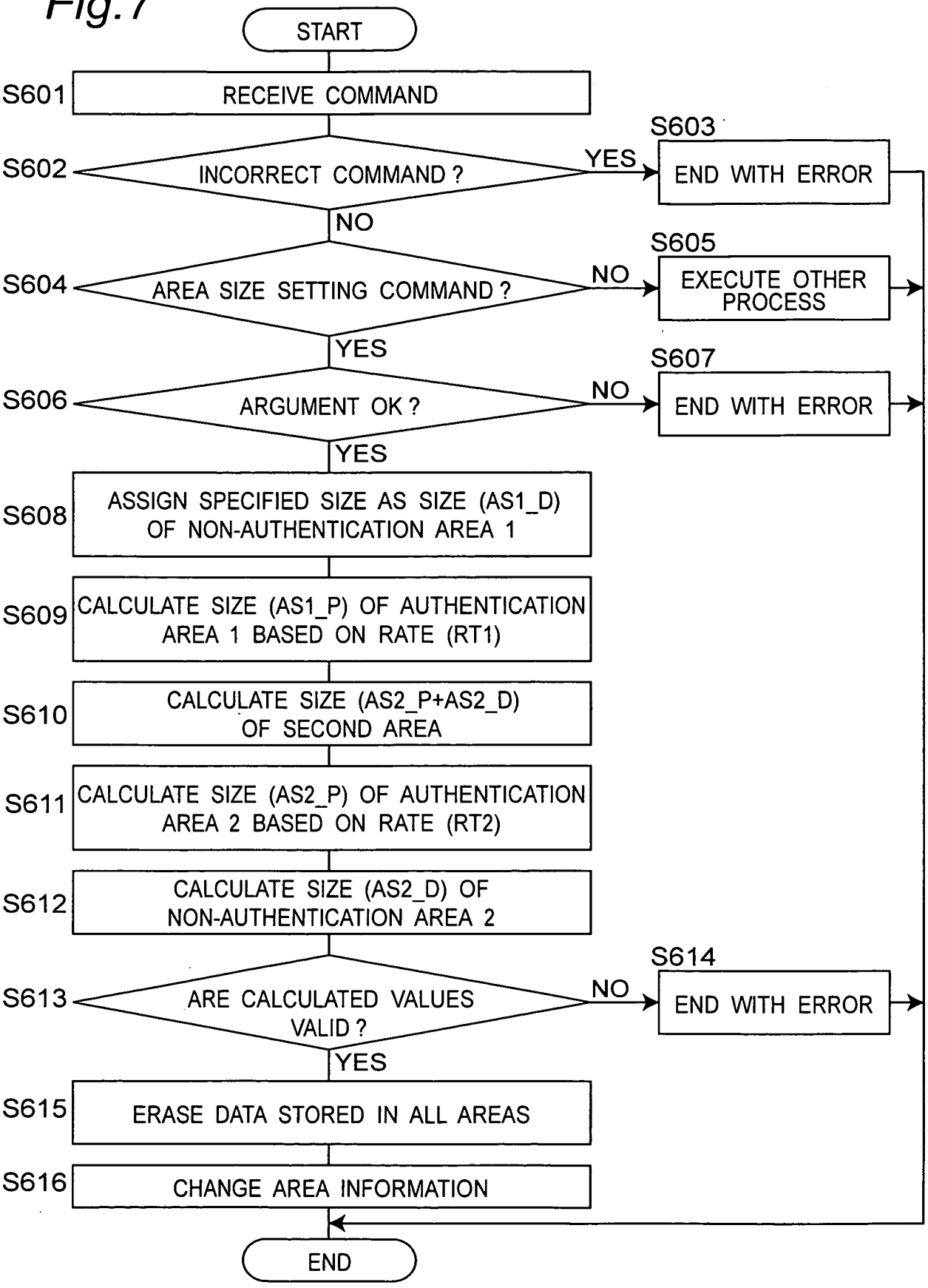

START
S601
RECEIVE COMMAND
S602
INCORRECT COMMAND ?
YES
S603
END WITH ERROR
NO
S604
AREA SIZE SETTING COMMAND ?
NO
S605
EXECUTE OTHER PROCESS
YES
S606
ARGUMENT OK ?
NO
S607
END WITH ERROR
YES
S608
ASSIGN SPECIFIED SIZE AS SIZE (AS1_D) OF NON-AUTHENTICATION AREA 1
S609
CALCULATE SIZE (AS1_P) OF AUTHENTICATION AREA 1 BASED ON RATE (RT1)
S610
CALCULATE SIZE (AS2_P+AS2_D) OF SECOND AREA
S611
CALCULATE SIZE (AS2_P) OF AUTHENTICATION AREA 2 BASED ON RATE (RT2)
S612
CALCULATE SIZE (AS2_D) OF NON-AUTHENTICATION AREA 2
S613
ARE CALCULATED VALUES VALID ?
NO
S614
END WITH ERROR
YES
S615
ERASE DATA STORED IN ALL AREAS
S616
CHANGE AREA INFORMATION
END

Fig.8

(a)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=7600MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=20MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=380MB
RATE OF AUTHENTICATION AREA 1 (RT1)=1%
RATE OF AUTHENTICATION AREA 2 (RT2)=5%

(b)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=4000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=5675MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=40MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=285MB
RATE OF AUTHENTICATION AREA 1 (RT1)=1%
RATE OF AUTHENTICATION AREA 2 (RT2)=5%

Fig.9

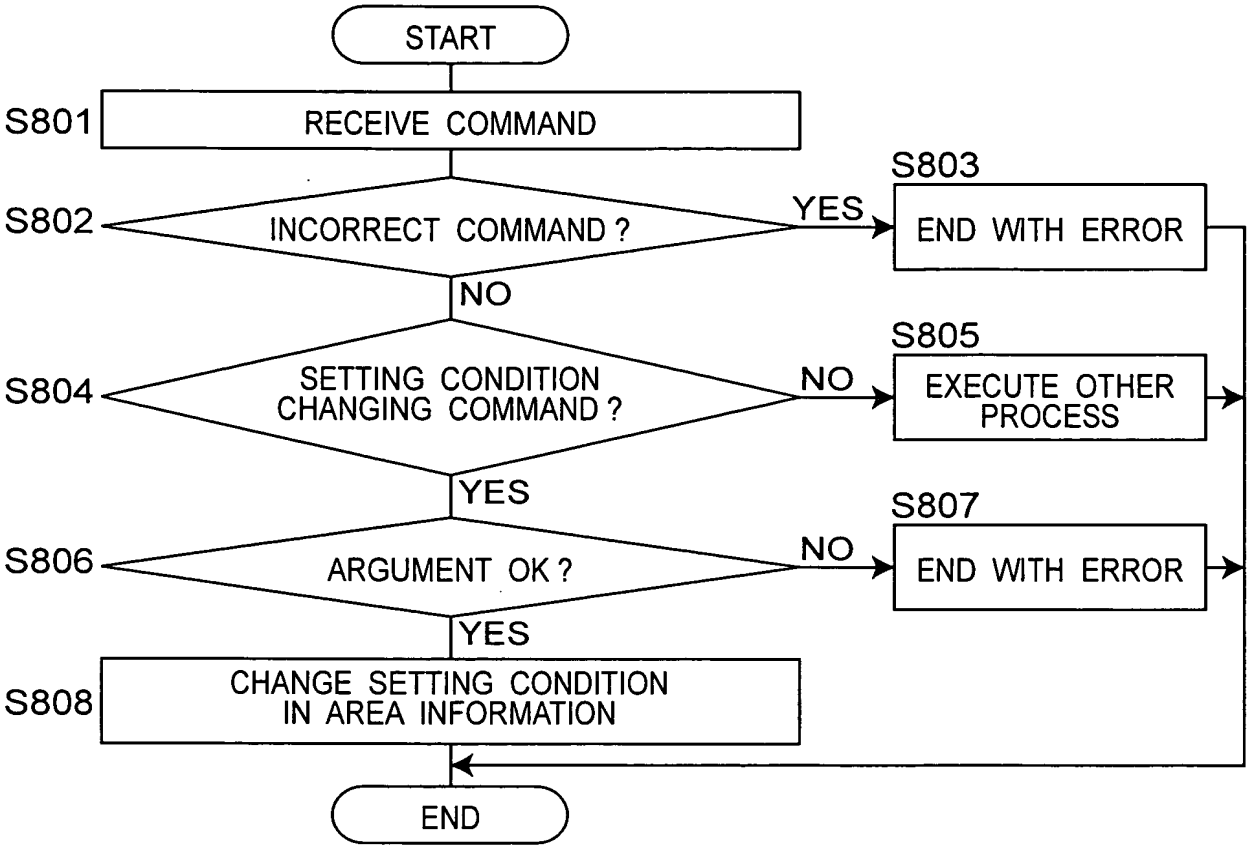

START
S801
RECEIVE COMMAND
S802
INCORRECT COMMAND ?
YES
S803
END WITH ERROR
NO
S804
SETTING CONDITION CHANGING COMMAND ?
NO
S805
EXECUTE OTHER PROCESS
YES
S806
ARGUMENT OK ?
NO
S807
END WITH ERROR
YES
S808
CHANGE SETTING CONDITION IN AREA INFORMATION
END

Fig.10

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=5000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=20MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=250MB
RATE OF AUTHENTICATION AREA 1 (RT1)=1%
RATE OF AUTHENTICATION AREA 2 (RT2)=5%

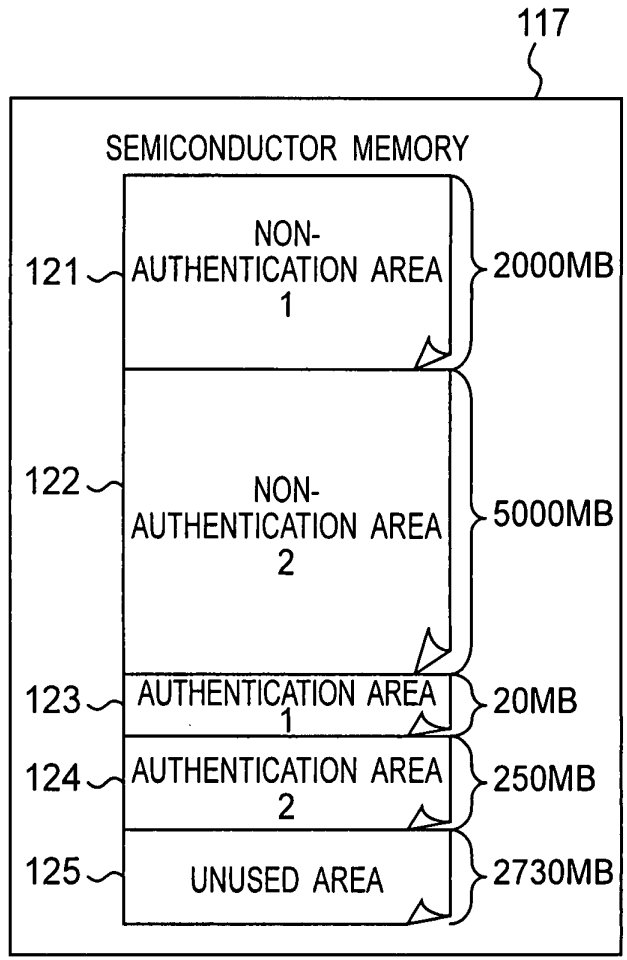


Fig. 11

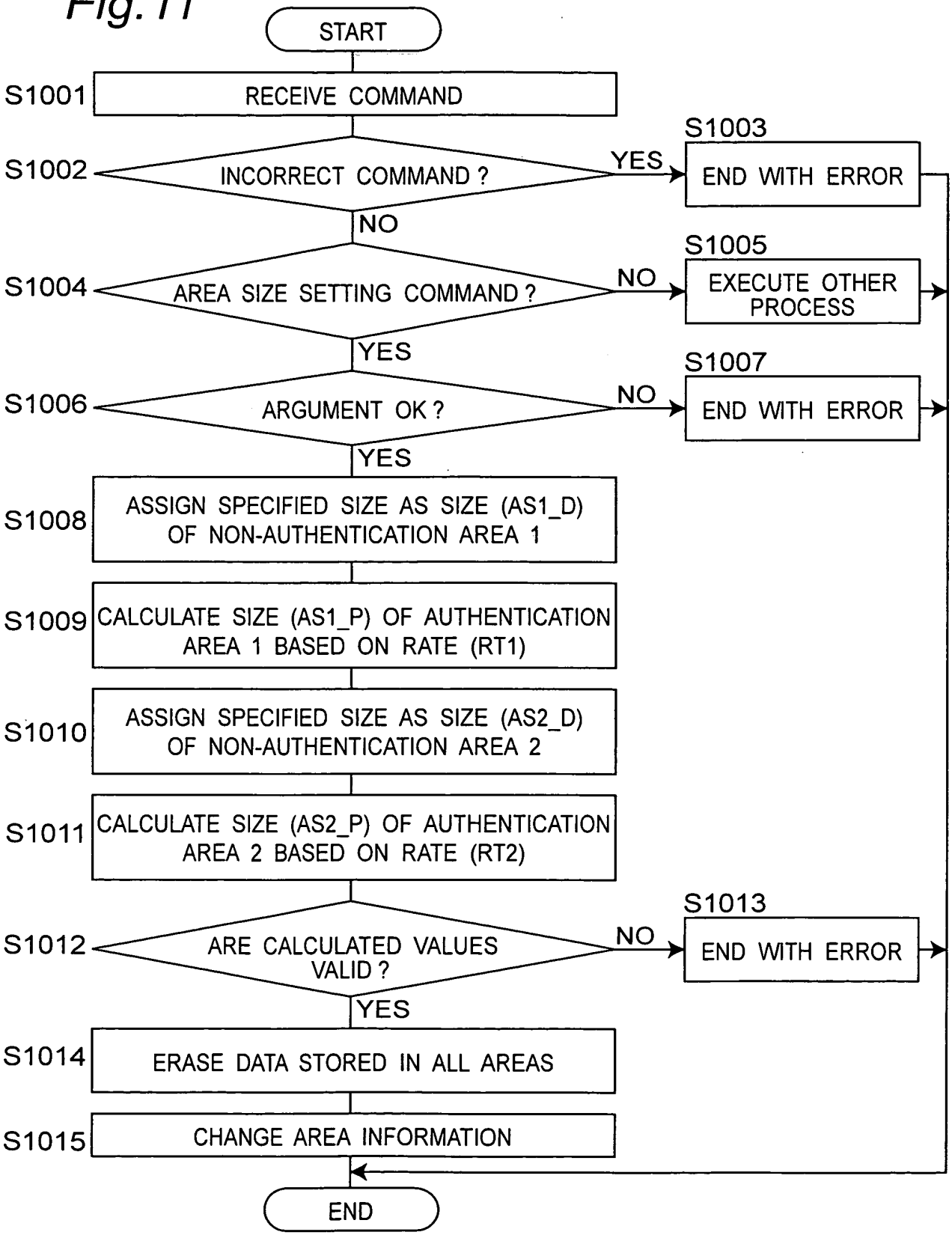

START
S1001
RECEIVE COMMAND
S1002
INCORRECT COMMAND ?
YES
S1003
END WITH ERROR
NO
S1004
AREA SIZE SETTING COMMAND ?
NO
S1005
EXECUTE OTHER PROCESS
YES
S1006
ARGUMENT OK ?
NO
S1007
END WITH ERROR
YES
S1008
ASSIGN SPECIFIED SIZE AS SIZE (AS1_D) OF NON-AUTHENTICATION AREA 1
S1009
CALCULATE SIZE (AS1_P) OF AUTHENTICATION AREA 1 BASED ON RATE (RT1)
S1010
ASSIGN SPECIFIED SIZE AS SIZE (AS2_D) OF NON-AUTHENTICATION AREA 2
S1011
CALCULATE SIZE (AS2_P) OF AUTHENTICATION AREA 2 BASED ON RATE (RT2)
S1012
ARE CALCULATED VALUES VALID ?
NO
S1013
END WITH ERROR
YES
S1014
ERASE DATA STORED IN ALL AREAS
S1015
CHANGE AREA INFORMATION
END

Fig.12

(a)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=5000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=20MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=250MB
RATE OF AUTHENTICATION AREA 1 (RT1)=1%
RATE OF AUTHENTICATION AREA 2 (RT2)=5%

(b)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=3000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=6000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=30MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=300MB
RATE OF AUTHENTICATION AREA 1 (RT1)=1%
RATE OF AUTHENTICATION AREA 2 (RT2)=5%

Fig.13

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=6000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=500MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=1500MB

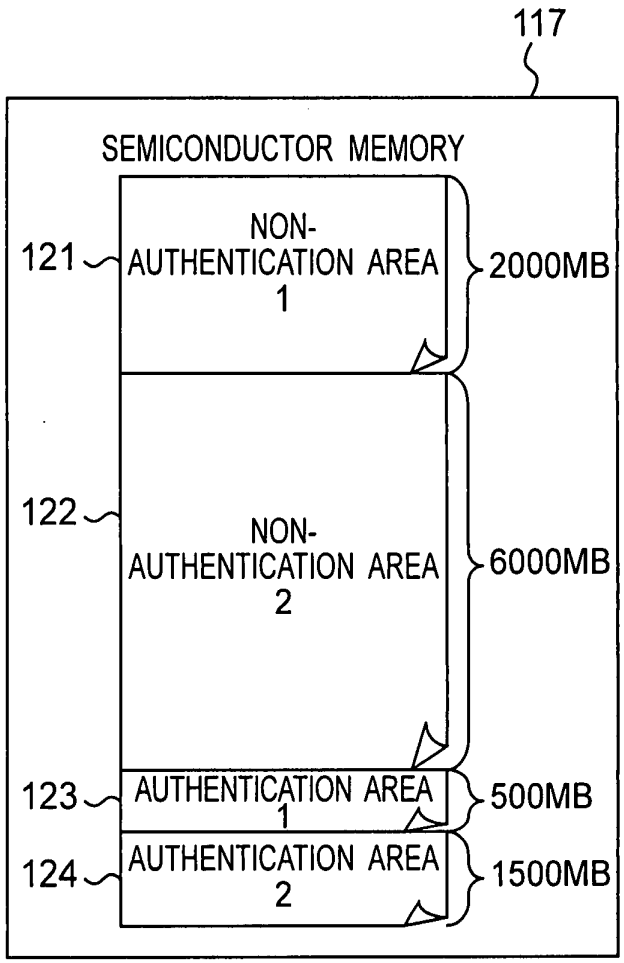


Fig.14

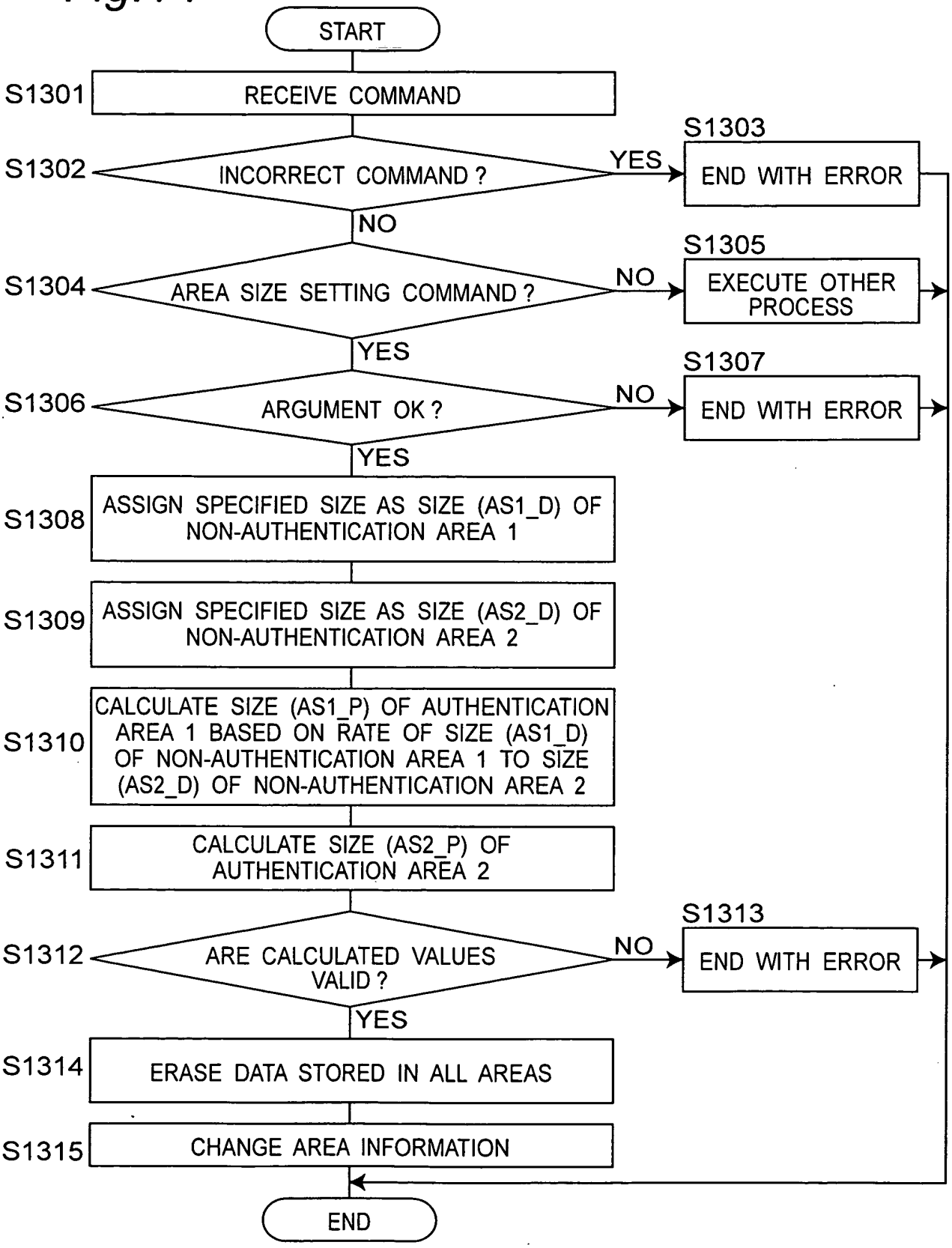

START
S1301
RECEIVE COMMAND
S1302
INCORRECT COMMAND ?
YES
S1303
END WITH ERROR
NO
S1304
AREA SIZE SETTING COMMAND ?
NO
S1305
EXECUTE OTHER PROCESS
YES
S1306
ARGUMENT OK ?
NO
S1307
END WITH ERROR
YES
S1308
ASSIGN SPECIFIED SIZE AS SIZE (AS1_D) OF NON-AUTHENTICATION AREA 1
S1309
ASSIGN SPECIFIED SIZE AS SIZE (AS2_D) OF NON-AUTHENTICATION AREA 2
S1310
CALCULATE SIZE (AS1_P) OF AUTHENTICATION AREA 1 BASED ON RATE OF SIZE (AS1_D) OF NON-AUTHENTICATION AREA 1 TO SIZE (AS2_D) OF NON-AUTHENTICATION AREA 2
S1311
CALCULATE SIZE (AS2_P) OF AUTHENTICATION AREA 2
S1312
ARE CALCULATED VALUES VALID ?
NO
S1313
END WITH ERROR
YES
S1314
ERASE DATA STORED IN ALL AREAS
S1315
CHANGE AREA INFORMATION
END

Fig.15

(a)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=6000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=500MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=1500MB

(b)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=3000MB
SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=5000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=750MB
SIZE OF AUTHENTICATION AREA 2 (AS2_P)=1250MB

Fig.16

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB	
TOTAL NUMBER OF STATES=2	
VALIDITY FLAG (AF)=CASE 1	
CASE 1	SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
	SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=5000MB
	SIZE OF AUTHENTICATION AREA 1 (AS1_P)=20MB
	SIZE OF AUTHENTICATION AREA 2 (AS2_P)=1500MB
CASE 2	SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=2000MB
	SIZE OF NON-AUTHENTICATION AREA 2 (AS2_D)=7600MB
	SIZE OF AUTHENTICATION AREA 1 (AS1_P)=20MB
	SIZE OF AUTHENTICATION AREA 2 (AS2_P)=380MB

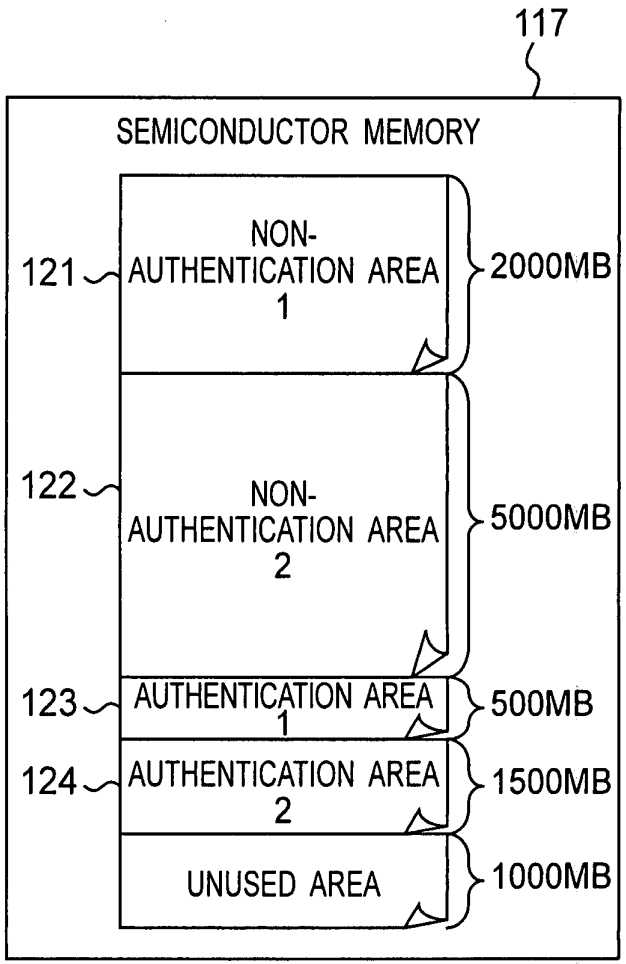


Fig.17

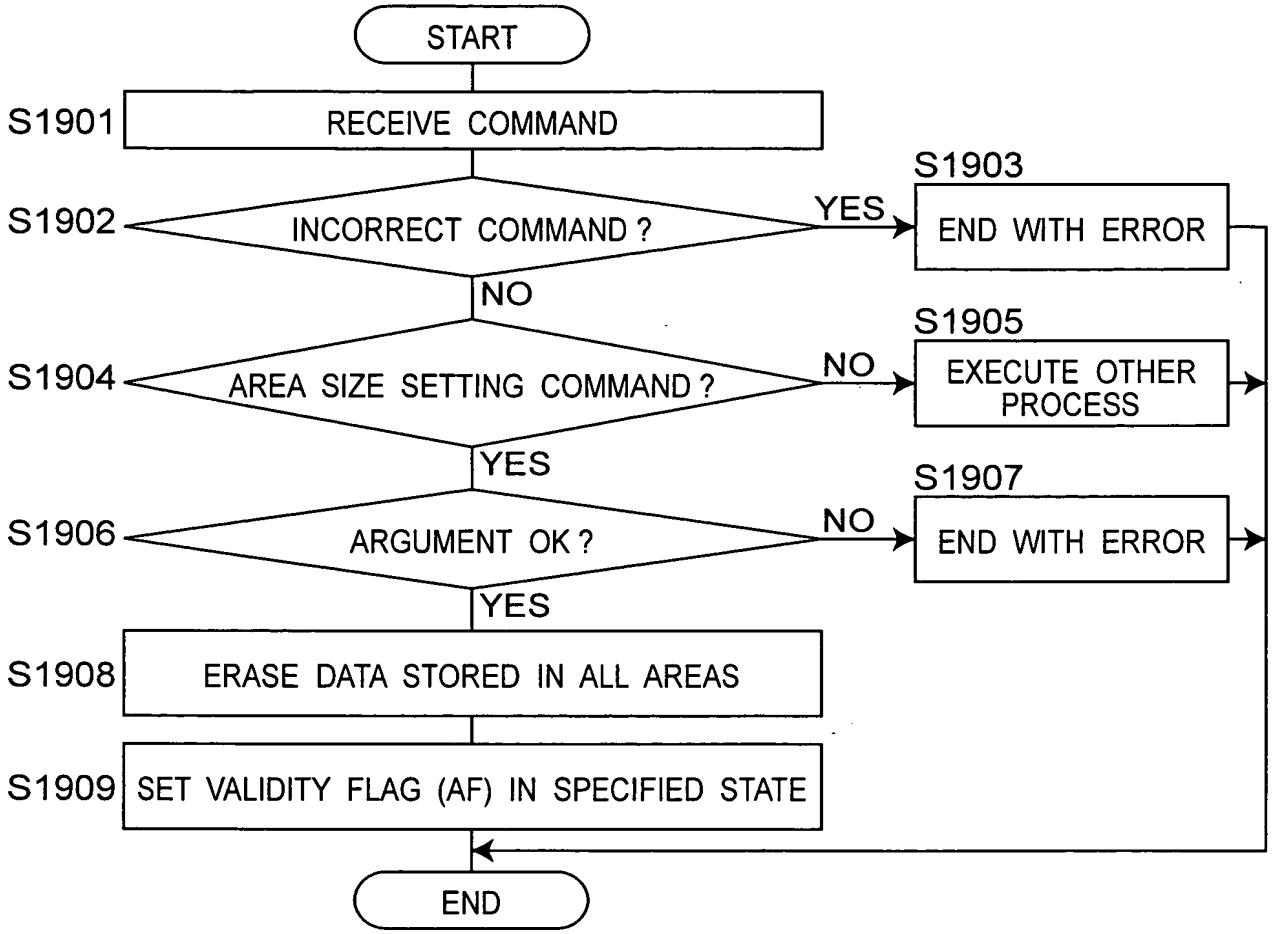

START
S1901
RECEIVE COMMAND
S1902
INCORRECT COMMAND ?
YES
S1903
END WITH ERROR
NO
S1904
AREA SIZE SETTING COMMAND ?
NO
S1905
EXECUTE OTHER PROCESS
YES
S1906
ARGUMENT OK ?
NO
S1907
END WITH ERROR
YES
S1908
ERASE DATA STORED IN ALL AREAS
S1909
SET VALIDITY FLAG (AF) IN SPECIFIED STATE
END

Fig.18

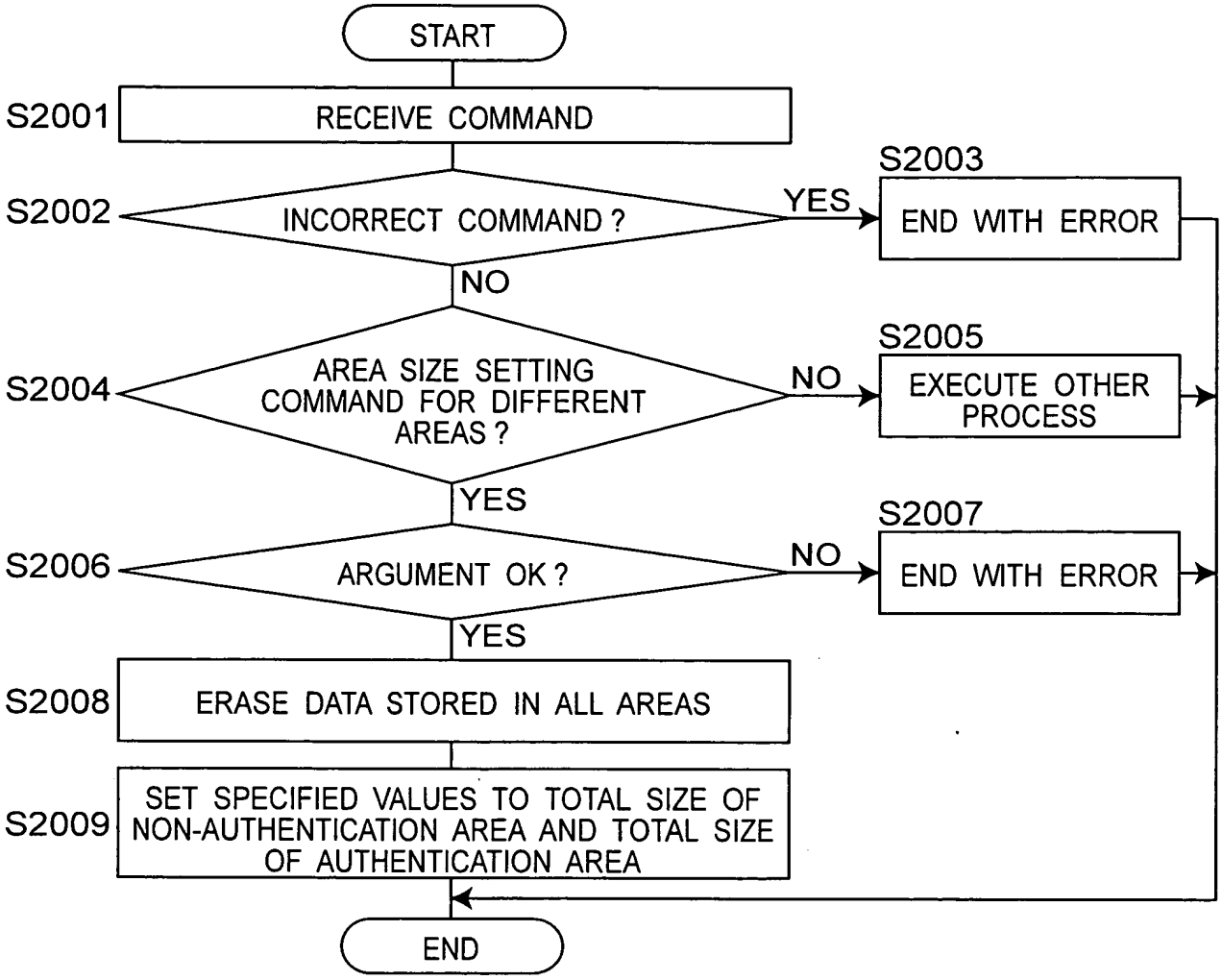

START
S2001
RECEIVE COMMAND
S2002
INCORRECT COMMAND ?
YES
S2003
END WITH ERROR
NO
S2004
AREA SIZE SETTING COMMAND FOR DIFFERENT AREAS ?
NO
S2005
EXECUTE OTHER PROCESS
YES
S2006
ARGUMENT OK ?
NO
S2007
END WITH ERROR
YES
S2008
ERASE DATA STORED IN ALL AREAS
S2009
SET SPECIFIED VALUES TO TOTAL SIZE OF NON-AUTHENTICATION AREA AND TOTAL SIZE OF AUTHENTICATION AREA
END

Fig.19

(a)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
TOTAL SIZE OF NON-AUTHENTICATION AREAS (TS_D)=8000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=1000MB
TOTAL SIZE OF AUTHENTICATION AREAS (TS_P)=2000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=500MB

(b)

AREA INFORMATION STORAGE SECTION 119

TOTAL CAPACITY OF MEMORY CARD (CS)=10000MB
TOTAL SIZE OF NON-AUTHENTICATION AREAS (TS_D)=7000MB
SIZE OF NON-AUTHENTICATION AREA 1 (AS1_D)=1000MB
TOTAL SIZE OF AUTHENTICATION AREAS (TS_P)=3000MB
SIZE OF AUTHENTICATION AREA 1 (AS1_P)=500MB

Fig.20

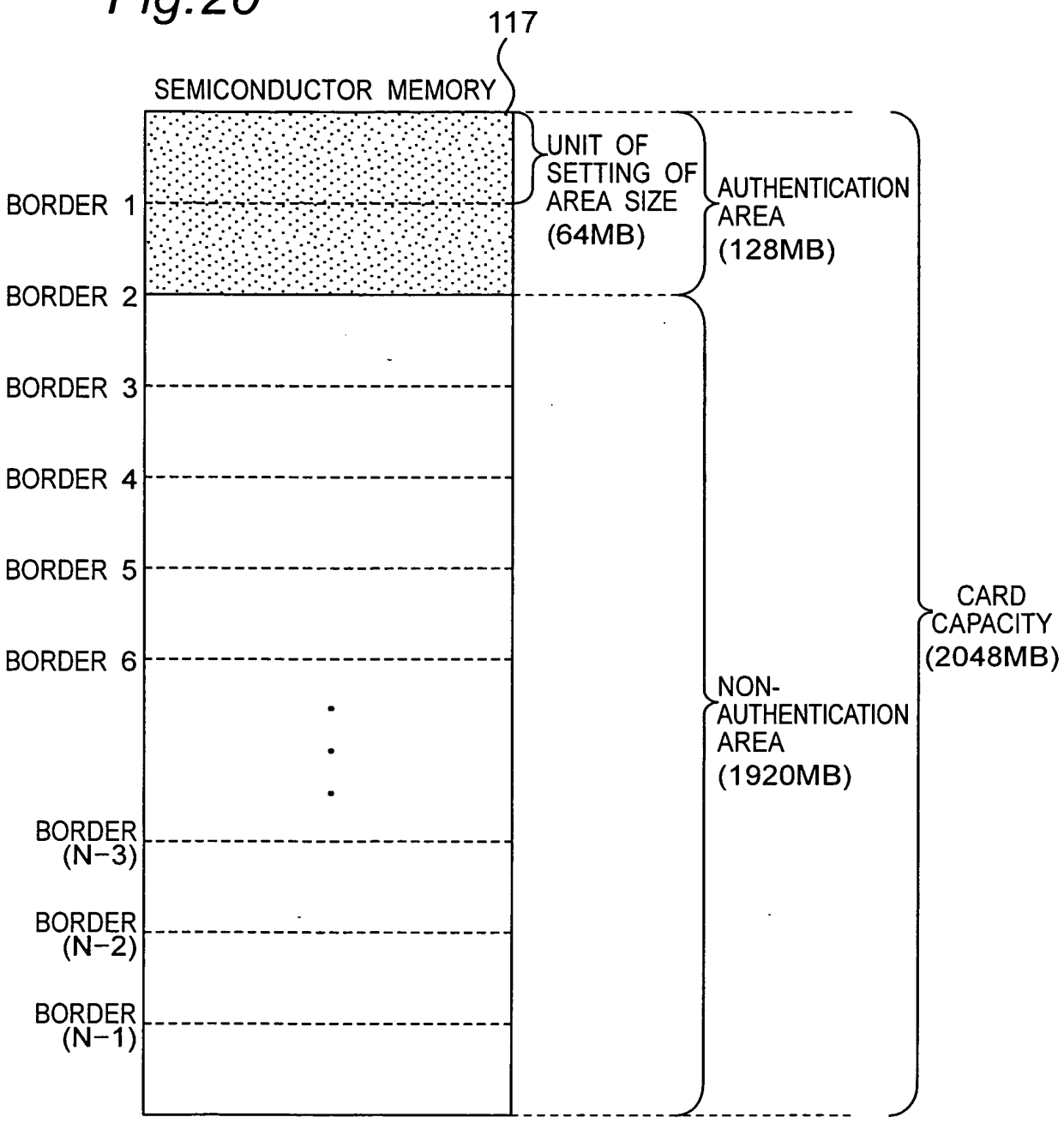

117
SEMICONDUCTOR MEMORY
UNIT OF SETTING OF AREA SIZE (64MB)
AUTHENTICATION AREA (128MB)
BORDER 1
BORDER 2
BORDER 3
BORDER 4
BORDER 5
BORDER 6
BORDER (N-3)
BORDER (N-2)
BORDER (N-1)
NON-AUTHENTICATION AREA (1920MB)
CARD CAPACITY (2048MB)

Fig.21

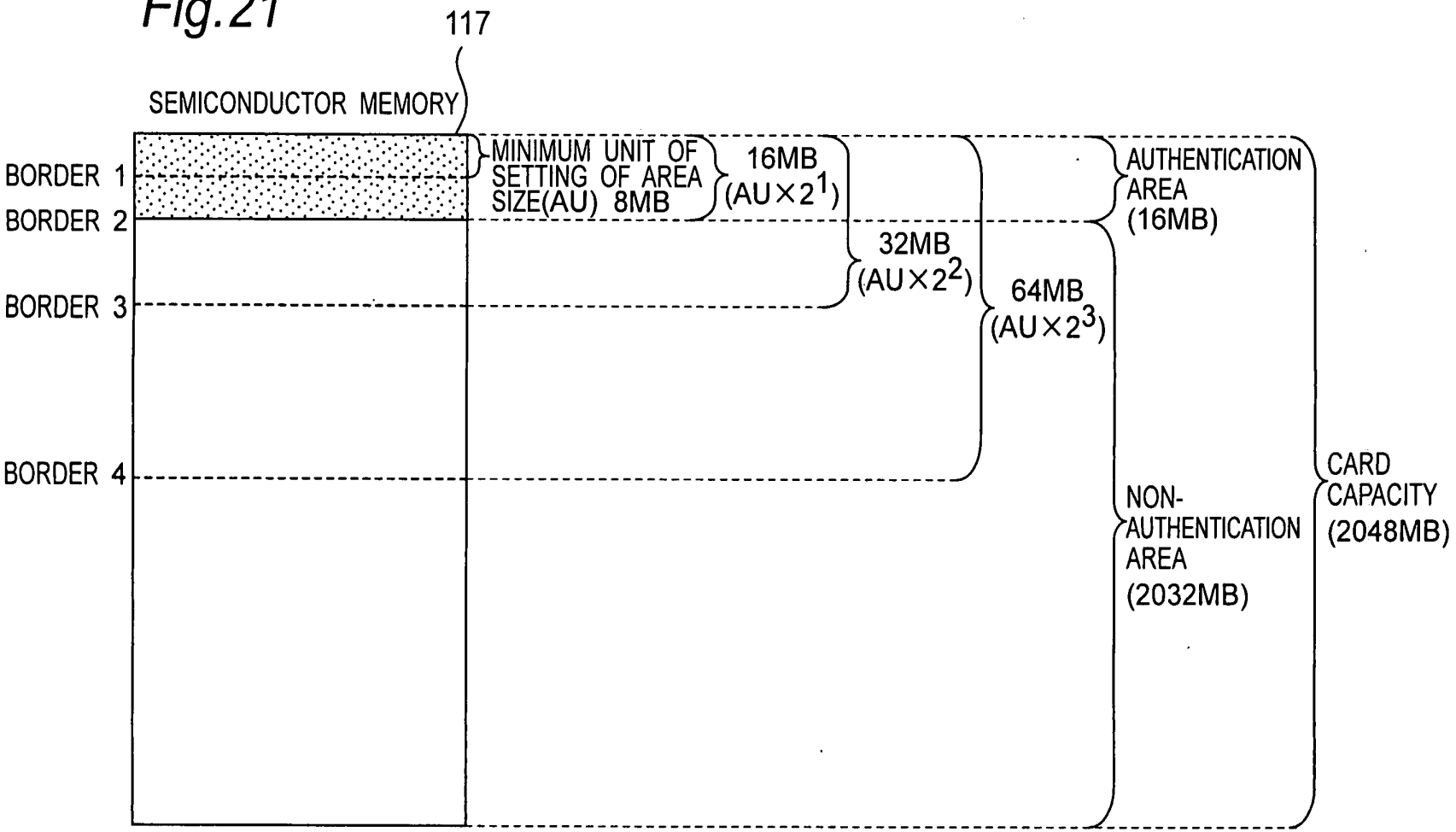

117
SEMICONDUCTOR MEMORY
BORDER 1
BORDER 2
BORDER 3
BORDER 4
MINIMUM UNIT OF SETTING OF AREA SIZE(AU) 8MB
16MB (AU×2^1)
32MB (AU×2^2)
64MB (AU×2^3)
AUTHENTICATION AREA (16MB)
NON-AUTHENTICATION AREA (2032MB)
CARD CAPACITY (2048MB)

Fig.22

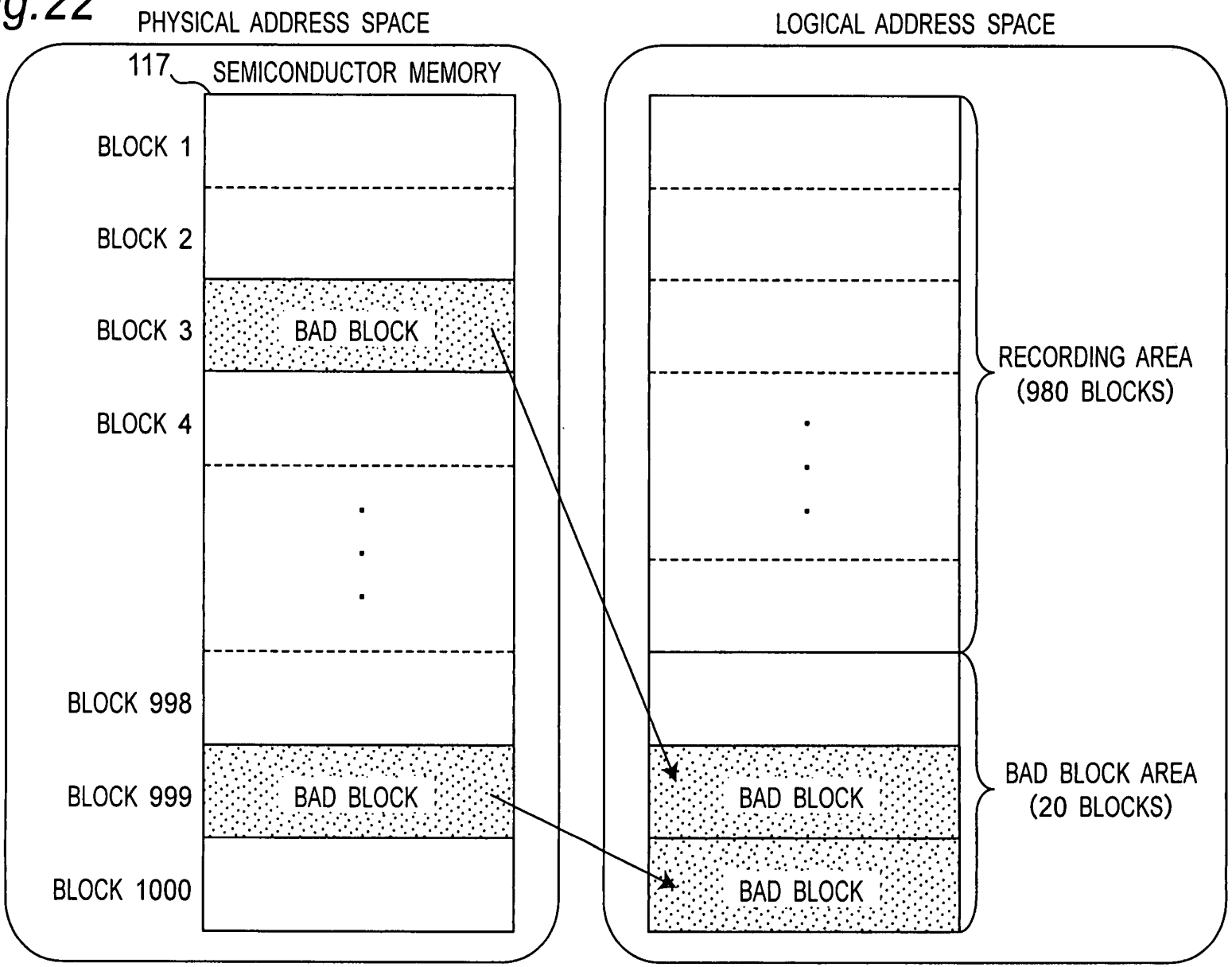

PHYSICAL ADDRESS SPACE
LOGICAL ADDRESS SPACE
117
SEMICONDUCTOR MEMORY
BLOCK 1
BLOCK 2
BLOCK 3
BAD BLOCK
BLOCK 4
BLOCK 998
BLOCK 999
BAD BLOCK
BLOCK 1000
RECORDING AREA
(980 BLOCKS)
BAD BLOCK
BAD BLOCK
BAD BLOCK AREA
(20 BLOCKS)

Fig.23

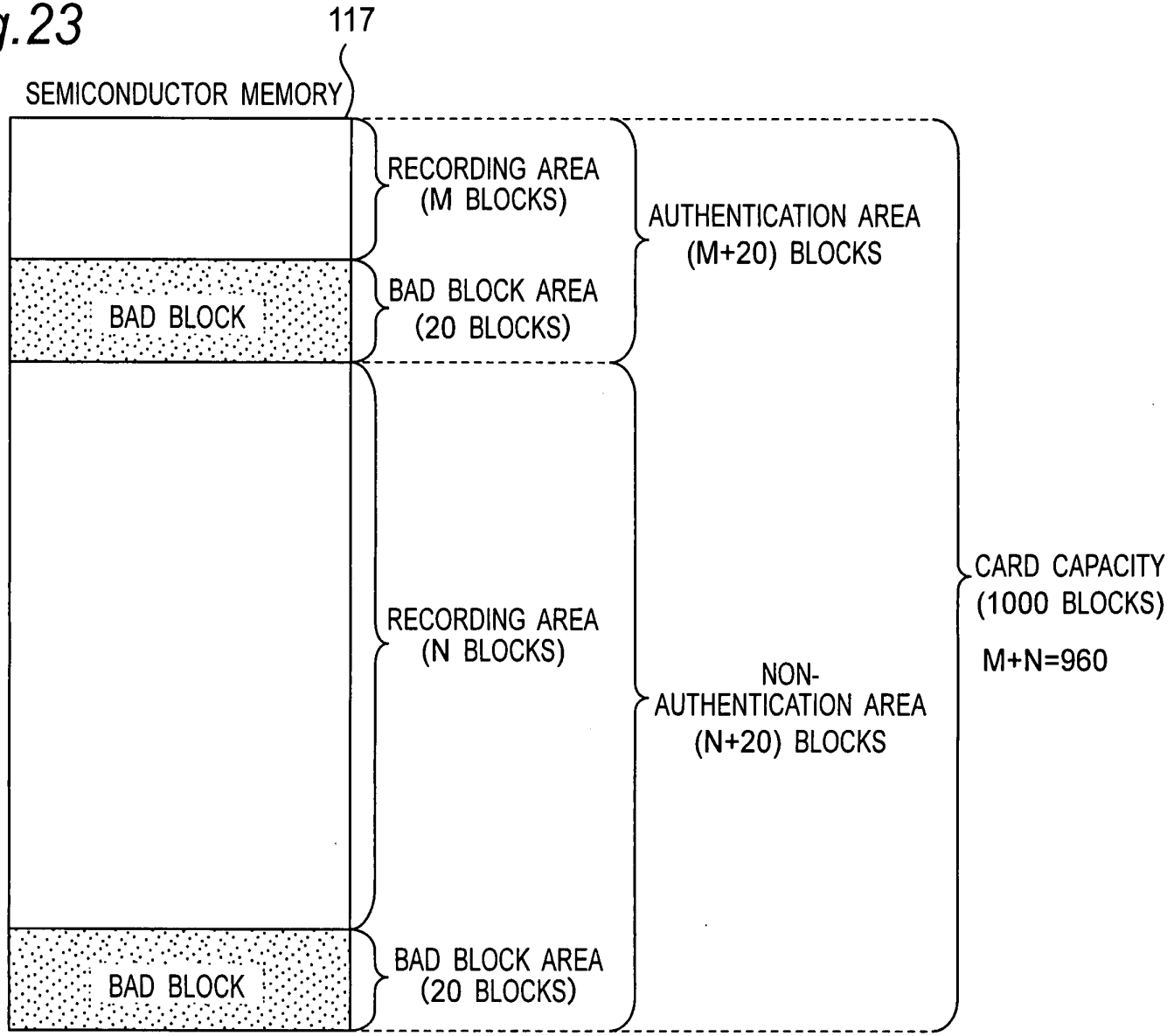
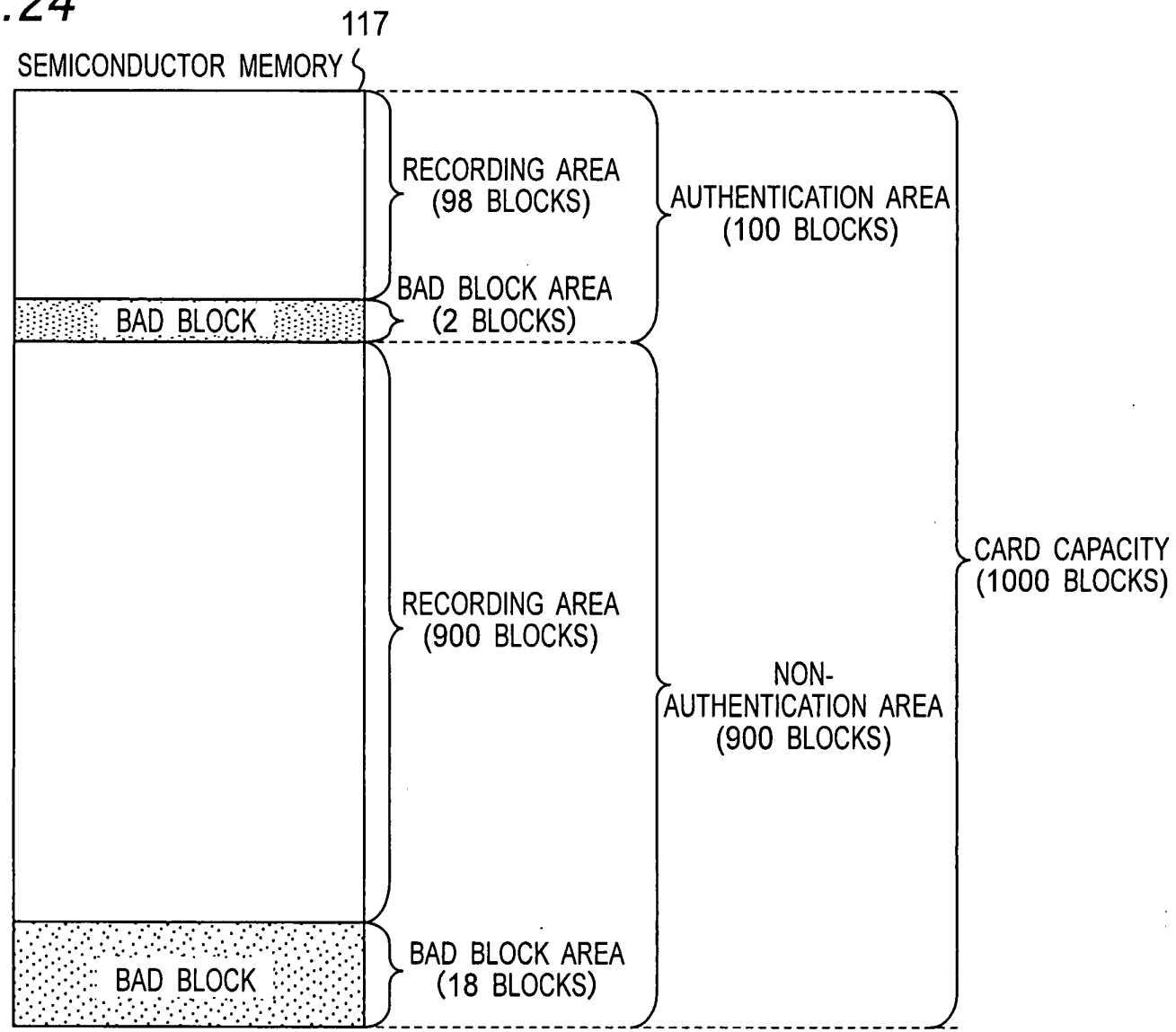

117
SEMICONDUCTOR MEMORY
RECORDING AREA
(M BLOCKS)
BAD BLOCK
BAD BLOCK AREA
(20 BLOCKS)
AUTHENTICATION AREA
(M+20) BLOCKS
RECORDING AREA
(N BLOCKS)
BAD BLOCK
BAD BLOCK AREA
(20 BLOCKS)
NON-
AUTHENTICATION AREA
(N+20) BLOCKS
CARD CAPACITY
(1000 BLOCKS)
M+N=960

Fig.24


117
SEMICONDUCTOR MEMORY
RECORDING AREA
(98 BLOCKS)
BAD BLOCK AREA
(2 BLOCKS)
BAD BLOCK
AUTHENTICATION AREA
(100 BLOCKS)
RECORDING AREA
(900 BLOCKS)
BAD BLOCK
BAD BLOCK AREA
(18 BLOCKS)
NON-
AUTHENTICATION AREA
(900 BLOCKS)
CARD CAPACITY
(1000 BLOCKS)